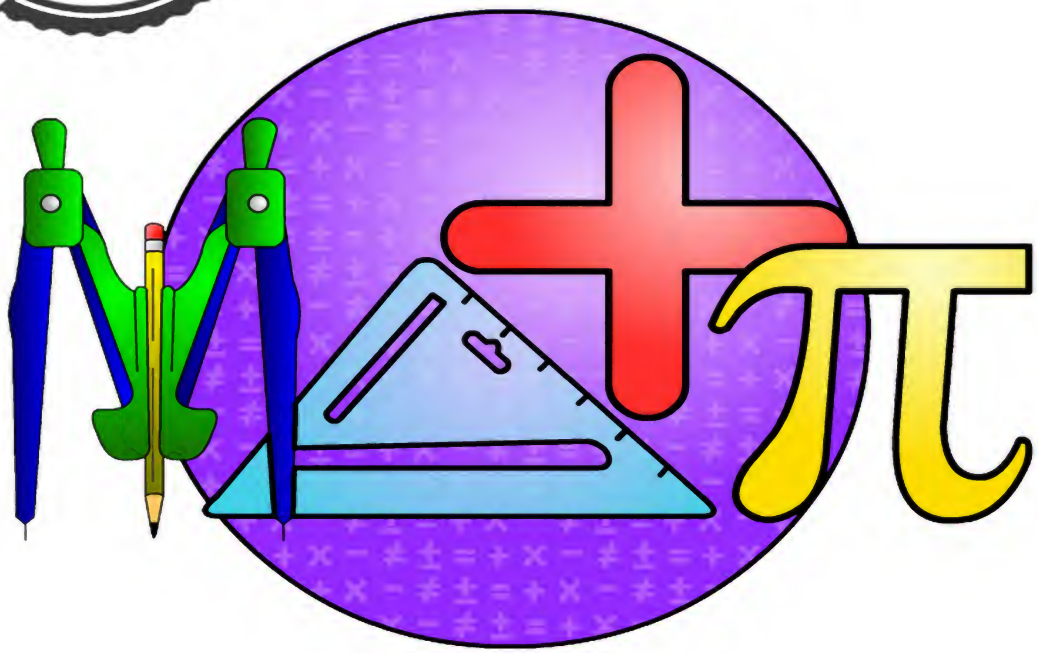
Mathematics Senior teacher

Mr. Ahmed Abd-Elwarith

The Legend



Grade 3 Alg. Preparatory

First term

Student Name .....

Class .....

Just for Study groups

Sheet 1

To	
Lesson	1
Unit	1

Answer the following questions :

1 Choose the correct answer from those given :

(1) If : $X = \{1 , 3 , 5\}$, $Y = \{2 , 4\}$, then : $n(X \times Y) =$ .....

(a) 3 (b) 6 (c) 5 (d) 2

(2) If : $X = \{2 , 1\}$, $Y = \{1 , 3\}$, then : $Y \times X =$ .....

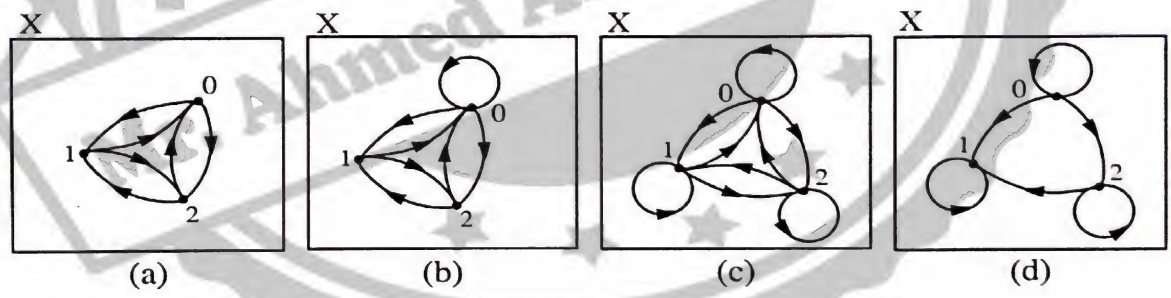
(a) $\{(2 , 1) , (2 , 3) , (1 , 1) , (1 , 3)\}$

(b) $\{(2 , 1) , (2 , 3) , (1 , 3)\}$

(c) $\{(1 , 2) , (1 , 1) , (3 , 2) , (3 , 1)\}$

(d) $\{(2 , 2) , (2 , 1) , (1 , 2) , (1 , 1)\}$

(3) If : $X = \{0 , 1 , 2\}$, then the arrow diagram which represents X^2 is .....



(a) (b) (c) (d)

(4) If : $(3^x , y^3) = (27 , 8)$, then : $(x , y) =$ .....

(a) $(2 , 2)$ (b) $(-1 , 3)$ (c) $(3 , 2)$ (d) $(-3 , 2)$

(5) If : $(2 , 3) \in \{2 , 5\} \times \{x , 6\}$, then : $x =$ .....

(a) 6 (b) 5 (c) 3 (d) 2

(6) If : $n(X^2) = 9$, $n(X \times Y) = 6$, then : $n(Y^2) =$ .....

(a) 3 (b) 2 (c) 9 (d) 4

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2 **[a]** If : $X = \{-1 , 0 , 1\}$, $Y = \{1 , 2\}$ **Find :** $X \times Y$ and represent it by cartesian diagram.

[b] If : $X \times Y = \{(2 , 3) , (2 , 4)\}$ **Find :** Y^2 and represent it by an arrow diagram.

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3 If : $X = \{1 , 2 , 6\}$, $Y = \{2 , 4 , 5 , 6\}$, $Z = \{4\}$

Represent the sets X , Y and Z by Venn diagram , then find :

(1) $(X \cap Y) \times Z$ (2) $(Y - Z) \times X$

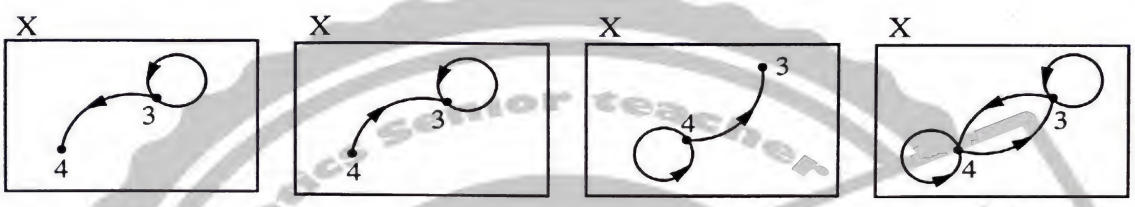
Sheet 2

To	
Lesson	2
Unit	1

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $X = \{3 , 4\}$, then the arrow diagram which represents a function on X is .....



(a) (b) (c) (d)

(2) If $(X - 3 , 2^y) = (2 , 32)$, then $(y , X) =$ .....

(a) $(2 , 5)$ (b) $(2 , 2)$ (c) $(5 , 2)$ (d) $(5 , 5)$

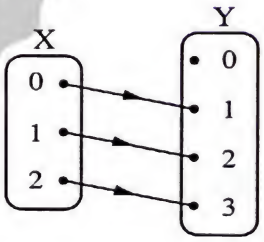
(3) If $n(X) = 4$, $n(Y) = 2$, then $n(X \times Y) =$ .....

(a) 4 (b) 2 (c) 6 (d) 8

(4) If $(b + 3 , 5)$ lies on y-axis , then b = ...

(a) zero (b) 3 (c) -3 (d) 5

(5) The opposite figure represents a function from X to Y , its range = ...



(a) $\{0 , 1 , 2\}$ (b) $\{1 , 2 , 3\}$

(c) $\{0 , 1 , 2 , 3\}$ (d) $\{(0 , 1) , (1 , 2) , (2 , 3)\}$

(6) If $X = \{1 , 2 , 3\}$, then $n(X \times \varnothing) =$ .....

(a) 3 (b) $\varnothing$

(c) 0 (d) $\{(1 , 0) , (2 , 0) , (3 , 0)\}$

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2 If $X = \{-2 , -1 , 0 , 1 , 2\}$ and R is a relation on X , where "a R b" means "a is the additive inverse of b" for each $a \in X$, $b \in X$

(1) Write R and represent it by an arrow diagram.

(2) Is R a function ? Why ?

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3 If $X = \{4 , 6 , 8 , k\}$, $Y = \{5 , 4 , 3 , 2\}$ and R is a relation from X to Y , where "a R b" means "$b = \frac{a}{2}$" for each $a \in X$, $b \in Y$

(1) Find the value of k that makes R is a function from X to Y

(2) Represent the function by a Cartesian diagram.

Sheet 3

To	
Lesson	3
Unit	1

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $X = \{2 , 4 , 6\}$ and the function $f : X \longrightarrow \mathbb{R}$ where $f(x) = 2x + 1$, then the range of the function f = ...

(a) $\{5 , 9 , 13\}$ (b) $[5 , 13]$ (c) $\{2 , 4 , 6\}$ (d) $\mathbb{R}$

(2) If the point (a , b) lies in the second quadrant , then a b ..... zero

(a) = (b) > (c) < (d) ≥

(3) If $f(x) = x^2 - x + 3$, then $f(3)$ = ...

(a) 3 (b) 6 (c) 9 (d) 12

(4) If (4 , a) ∈ the set of the function f where $f(x) = x + 1$, then a = ...

(a) 3 (b) 4 (c) 5 (d) 6

(5) If $X \times Y = \{(2 , 3) , (2 , 4) , (2 , 5)\}$, then n (X^2) = ...

(a) $\{2\}$ (b) 4 (c) 1 (d) $\{4\}$

(6) The function $f : f(x) = x^3 - (x^3 + 7)$ is a polynomial function of the ..... degree.

(a) first (b) second (c) third (d) zero

---

2 If the function $f : \mathbb{Z} \longrightarrow \mathbb{Z}$ where $f : x \longrightarrow 2x - 1$

(1) Find : $f(1)$, $f(-2)$, $f(0)$, $f(2)$

(2) Draw a part of the perpendicular square net of the cartesian product $\mathbb{Z} \times \mathbb{Z}$ and represent on it some elements of f

(3) If $f(x) = 9$, then find the value of x

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3 If the function $f = \{(0 , 4) , (1 , 3) , (2 , 2) , (3 , 1)\}$

(1) Write each of domain and range of the function f

(2) Write the rule of the function f

Sheet 4

To	
Lesson	4
Unit	1

Answer the following questions :

1 Choose the correct answer from those given :

(1) The function $f : f(x) = x^2 - (x-3)^2$ is a polynomial of ..... degree.

(a) first (b) second (c) third (d) fourth

(2) Which of the following represents a rule for a polynomial ?

(a) $f(x) = x\left(\frac{1}{x} + 1\right)$ (b) $f(x) = 2x^{-3} + 5$

(c) $f(x) = x^2 + \sqrt{x}$ (d) $f(x) = \frac{1}{3}x^2 - 5x + 1$

(3) If $X = \{1, 3, 5\}$ and n (Y) = 4 and the function $f : X \longrightarrow Y$, where $f(x) = x + 2$, then Y may be .....

(a) $\{3, 5, 7\}$ (b) $\{3, 4, 5, 6\}$

(c) $\{1, 2, 3, 5\}$ (d) $\{3, 4, 5, 7\}$

(4) The linear function which is defined by the rule $y = 1 - 2x$ is represented graphically by a straight line intersects x-axis at the point .....

(a) (1 , 0) (b) (0 , 1) (c) $\left(\frac{1}{2}, 0\right)$ (d) $\left(0, \frac{1}{2}\right)$

(5) If $f(x) = 5$, then $f(5) + f(-5)$ = ...

(a) 0 (b) – 10 (c) 10 (d) $f(10)$

(6) If $f(x) = 2x + b$, $f(3)$ = zero , then b = ...

(a) 0 (b) – 6 (c) 6 (d) 3

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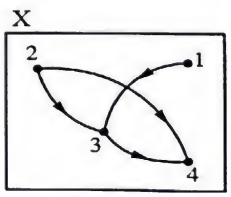
2 [a] The opposite arrow diagram shows the relation R on X , where $X = \{1, 2, 3, 4\}$

Write R , then show if R is a function or not. Give reasons.



[b] Graph the function $f : \mathbb{R} \longrightarrow \mathbb{R}$, $f(x) = 2x - 4$

(1) From the graph find the points of intersection with x- axis and y-axis.

(2) If $f(a) = 20$, find the value of a

---

3 Graph the function f : $f(x) = 3 - 2x - x^2$ in $\mathbb{R}$ taking $x \in [-4, 2]$, then find :

(1) The maximum value or the minimum value of the function.

(2) The equation of the axis of symmetry.

Sheet 5

To	
Lesson	1
Unit	2

Answer the following questions :

1 Choose the correct answer from those given :

(1) The second proportional of the quantities 6 , 3 and 8 is .....

(a) 48 (b) 16 (c) $\frac{28}{9}$ (d) $\frac{1}{7}$

(2) If a , 3 x , b and 9 x are proportional quantities , then $\frac{a}{b}$ = ...

(a) 9 (b) 3 (c) 6 (d) $\frac{1}{3}$

(3) If $f(x) = 5$, then $f(-2x)$ = ...

(a) -10 (b) 10 (c) -5 (d) 5

(4) If $X = \{1 , 2 , 3\}$, then the relation that represent a function on X is .....

(a) $\{(1 , 1) , (1 , 2) , (1 , 3)\}$ (b) $\{(1 , 1) , (2 , 1) , (3 , 1)\}$

(c) $\{(1 , 1) , (2 , 2) , (2 , 3)\}$ (d) $\{(1 , 1) , (2 , 2)\}$

(5) If $4x^2 - 12xy + 9y^2 = 0$, $x \in \mathbb{R}$, $y \in \mathbb{R}$, then $\frac{x}{y}$ = ...

(a) $\frac{2}{3}$ (b) $-\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $-\frac{3}{2}$

(6) If $\frac{a}{b} = \frac{2}{3}$, $\frac{a}{c} = \frac{3}{5}$, then a : b : c = ...

(a) 2 : 3 : 5 (b) 6 : 9 : 10 (c) 2 : 6 : 5 (d) 6 : 3 : 10

---

2 [a] If $X = \{1 , 2 , 3\}$, $Y = \{9 , 1 , 6 , 3\}$ and R is a relation from X to Y where "a R b" means "$a = \frac{1}{3} b$" for each $a \in X$ and $b \in Y$, write R and represent it by an arrow diagram. Is R a function from X to Y ? and if "3 R x" , then find : $\sqrt{x}$

[b] Find the number , if its square is subtracted from the terms of the ratio 49 : 69 , then it will become $\frac{2}{3}$

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3 [a] If $\frac{a}{b} = \frac{2}{5}$, then find the value of the expression : $3a + 2b : 5a - b$

[b] If $\frac{a}{b - a} = \frac{c}{d - c}$

, then prove that : a , b , c and d are proportional.

Sheet 6

To	
Lesson	2
Unit	2

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $5a = 9b$, then $\left(\frac{a}{b}\right)^{-1} =$ .....

(a) $\frac{9}{5}$ (b) $\frac{25}{81}$ (c) $\frac{5}{9}$ (d) $\frac{81}{25}$

(2) If $\frac{a}{b} = \frac{c}{d} = \frac{2}{3}$, then $\frac{a+2c}{b+2d} =$ .....

(a) $\frac{4}{9}$ (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $\frac{1}{3}$

(3) The set of images of the elements of the domain of a function f is called .....

(a) domain of the function. (b) codomain of the function.

(c) range of the function. (d) rule of the function.

(4) If $(a , -a)$ is an element of R of the function f where $f(x) = 2x - 3$, then $a =$ .....

(a) 1 (b) 2 (c) 3 (d) -3

(5) $\frac{a}{2} = \frac{c}{3} = \frac{e}{4} = \frac{2a+3c-2e}{.....}$

(a) -5 (b) 9 (c) 5 (d) 3

(6) $\frac{xz}{y} = \frac{4x^2z}{.....}$

(a) $4z$ (b) $4y$ (c) $4x$ (d) $4xy$

---

2 **[a]** If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ **Prove that :** $\frac{7a+5c-e}{7b+5d-f} = \frac{c}{d}$

[b] Find the number which is added to each of the following numbers : 5 , 7 , 21 , 27 , then they will become proportional.

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3 **[a]** If x , y , z and ℓ are proportional quantities ,

then prove that : $\frac{x^2+2z^2}{y^2+2\ell^2} = \frac{xz}{y\ell}$

[b] Represent graphicaly the function $f : f(x) = (x-2)^2$ taking $x \in [-1 , 5]$,

from the graph deduce :

(1) The maximum or minimum value of the function.

(2) The equation of the axis of symmetry.

Sheet 7

To	
Lesson	3
Unit	2

Answer the following questions :

1 Choose the correct answer from those given :

(1) If x , 4 , 6 , 2 are four proportional quantities , then x = ...

(a) 12 (b) $\frac{4}{3}$ (c) $\frac{3}{4}$ (d) $\frac{1}{12}$

(2) The proportional mean between $(x-3)$, $(x+3)$ = ...

(a) $\sqrt{x+3}$ (b) x^2-9 (c) $\pm\sqrt{x^2-9}$ (d) $\pm(x^2-9)$

(3) If $(x^3-2 , y-2) = \left(25 , |\sqrt[3]{-8}|\right)$, then (y , x) = ...

(a) (3 , 0) (b) (0 , 3) (c) (3 , 4) (d) (4 , 3)

(4) Which of the following relations represents a function from X to Y ?

(a) (b) (c) (d)

(5) If $\frac{a}{b}=\frac{c}{d}=\frac{1}{4}$, then $\frac{a+c}{b+d}$ = ...

(a) 2 (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) 4

(6) If $\frac{a}{b}=\frac{b}{c}=\frac{c}{5}=2$, then a = ...

(a) 5×2^2 (b) 40 (c) – 1 (d) 2×5^3

---

2 **[a]** If a , b , c , d are in continued proportion , **prove that :** $\frac{a^3+b^3}{b^3+c^3}=\frac{a^2}{bc}$

[b] If $\frac{a}{2}=\frac{b}{3}=\frac{c}{4}=\frac{2a-b+5c}{3x}$ **Find the value of :** x

---

3 Graph the function f : $f(x)=x^2-4$ in the interval $[-3 , 3]$ and from the graph find :

(1) The coordinates of the vertex of the curve.

(2) The equation of the axis of symmetry.

(3) The maximum of minimum value of the function.

Sheet 8

To	
Lesson	4
Unit	2

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $y \propto \frac{1}{x^2}$, then y varies .....

(a) directly as x (b) directly as x^3

(c) directly as x^2 (d) inversely as x^2

(2) If $\frac{a}{3} = \frac{b}{4}$, then : $4a - 3b + 5 =$ .....

(a) 4 (b) 3 (c) 5 (d) 7

(3) The function $f : f(x) = x(2x - 1)^2 + 3$ is a polynomial of the ..... degree.

(a) first (b) second (c) third (d) fourth

(4) The middle proportion between x and y is .....

(a) xy (b) $\sqrt{xy}$ (c) $-\sqrt{xy}$ (d) $\pm\sqrt{xy}$

(5) If $(3, 4) \in \{3, 6\} \times \{x, 7\}$, then $x =$ .....

(a) 3 (b) 6 (c) 4 (d) 7

(6) If x varies inversely as y , then $\frac{y_1}{y_2} = \frac{\ldots\ldots}{\ldots\ldots}$

(a) $\frac{m x_1}{x_2}$ (b) $\frac{x_1}{x_2}$ (c) $\frac{x_2}{x_1}$ (d) $\frac{1}{x_1 x_2}$

---

2 **[a]** If $\frac{a^2 + b^2}{b^2} = \frac{b^2 + c^2}{c^2}$, **then prove that :** b is the middle proportional between a and c

[b] If $X = \{2, 3, 4\}$, $Y = \{y : y \in \mathbb{N}, 2 \leq y < 9\}$ where $\mathbb{N}$ is the set of natural numbers and R is a relation from X to Y where "a R b" means "$a = \frac{1}{2}$ b" for each $a \in X$ and $b \in Y$, write R and represent it by an arrow diagram , is R a function from X to Y ? find the range if it is a function.

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3 **[a]** If $4x^2 + 9y^2 = 12xy$, **then prove that :** x varies directly as y

[b] If the speed of expression v of water to pass through a hose nozzle inversely changes with the square of the hose nozzle radius length r and v = 5 cm./sec. when r = 3 cm. Find v when $r = 3\frac{3}{4}$ cm.

Sheet 9

To	
Lesson	1
Unit	3

Answer the following questions :

1 Choose the correct answer from those given :

(1) Choosing a sample from the society's layers in statistics is called a ..... sample.

(a) homogeneous (b) layer (c) intentional (d) cluster

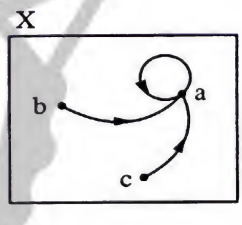
(2) The relation that represents a direct variation between x and y is .....

(a) $x\,y = 5$ (b) $y = x - 4$ (c) $\frac{x}{3} = \frac{4}{y}$ (d) $\frac{x}{7} = \frac{y}{5}$

(3) If 4 , -10 and x are proportional quantities , then $x =$ .....

(a) -5 (b) 5 (c) -25 (d) 25

(4) **The opposite figure :** represent a function on X , its range is .....



(a) $\{a\}$ (b) $\{a , b , c\}$

(c) $\{a , b\}$ (d) $\{b , c\}$

(5) If $(x - 5 , x + 3)$ lies in the second quadrant , then $x =$ .....

(a) 3 (b) 5 (c) 7 (d) 9

(6) The vertex of the curve of the quadratic function f is the point $(2 , -1)$, then the equation of the axis of symmetry is .....

(a) $x = 2$ (b) $x = -2$ (c) $x = 1$ (d) $x = -1$

---

2 One of the car factories produced 3000 cars of model (A) , 1000 cars of model (B) , 2000 cars of model (C) and 4000 cars of model (D). If we want to draw a layer sample of size 500 cars to represent each layer due to its size.

Calculate the number of individuals of each layer in the sample.

---

3 **[a]** If a , b , c and d are in continued proportional

, then prove that : $\frac{a\,b - c\,d}{b^2 - c^2} = \frac{a + c}{b}$

[b] If the weight of body on Earth (R) directly varies with its weight on the moon (W) , If $R_1 = 182$ kg. , $W_1 = 35$ kg. , then **find :** W_2 when $R_2 = 312$ kg.

Sheet 10

To	
Lesson	2
Unit	3

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $9x^2 + 25y^2 = 30xy$, then $\frac{x}{y}$ = ...

(a) $\frac{9}{25}$ (b) $\frac{9}{30}$ (c) $\frac{5}{3}$ (d) $\frac{3}{5}$

(2) If $X = \{3\}$, then X^2 = ...

(a) $\{3\}$ (b) $\{9\}$ (c) $\{(3 , 9)\}$ (d) $\{(3 , 3)\}$

(3) The linear function $f : f(x) = 2x - 1$ is represented by a straight line intersecting the x-axis at the point .....

(a) (0 , 1) (b) (0 , – 1) (c) $\left(\frac{1}{2} , 0\right)$ (d) $\left(-\frac{1}{2} , 0\right)$

(4) If $\Sigma (x - \bar{x})^2 = 36$ of a set of values and the number of values equals 9 , then σ = ...

(a) 2 (b) 4 (c) 18 (d) 27

(5) The range of the values : 3 , 17 , 12 , 30 , 28 is .....

(a) 3 (b) 27 (c) 33 (d) 30

(6) From the measures of dispersions is the .....

(a) mean. (b) median.

(c) mode. (d) standard deviation.

---

2 The following is the frequency distribution of the number of damaged units which were found in 100 boxes of the produced units.

Number of damaged units	zero	1	2	3	4	5
Number of boxes	3	16	17	25	20	19

Find the standard deviation of the damaged units.

---

3 **[a]** If $x = z + 8$, z varies inversely as y and $z = 2$, when $y = 3$

Find : y when $x = 3$

[b] If $X = \{-2 , 2 , 3\}$, $Y = \{3 , 5 , \ell\}$ and the relation R is from X to Y , where "a R b" means "$b = a^2 - 1$" for every $a \in X$, $b \in Y$ represents a function from X to Y

(1) Find the value of ℓ

(2) Represent the function R by an arrow diagram and another graphical diagram.

(3) Mention the range of the function.

Mathematics Senior teacher

Mr. Ahmed Abd-Elwarith

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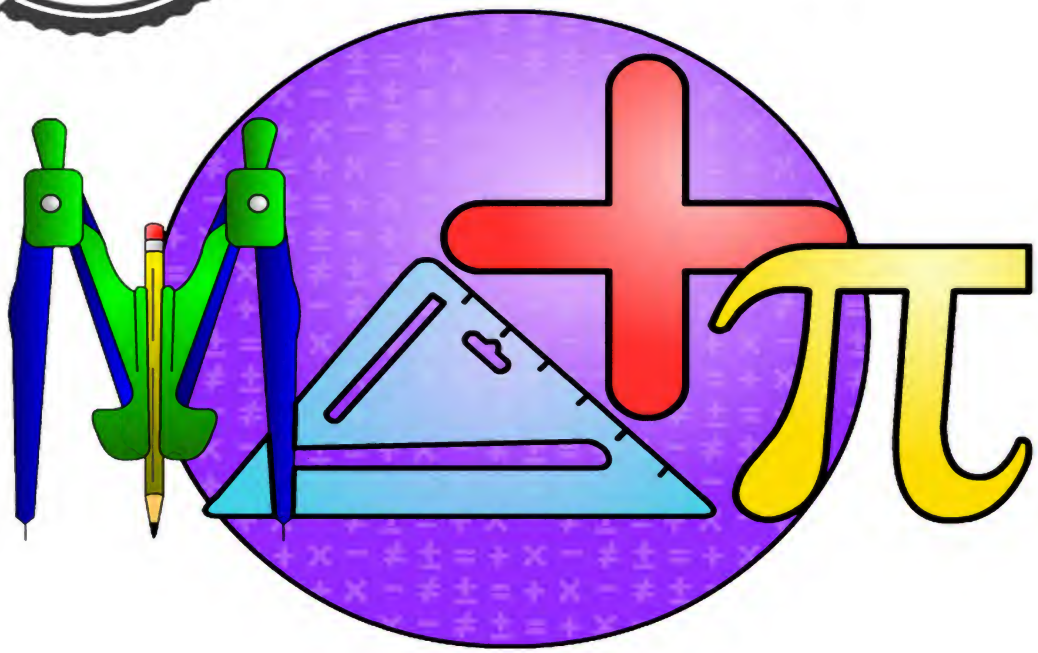


Grade 3 Geo. Preparatory

First term

Student Name .....

Class .....

Just for Study groups

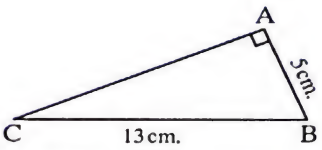
Sheet 1

To	
Lesson	1
Unit	4

Answer the following questions :

1 Choose the correct answer from those given :

(1) In the opposite figure :



Δ ABC in which : m ($\angle$ A) = 90° ,

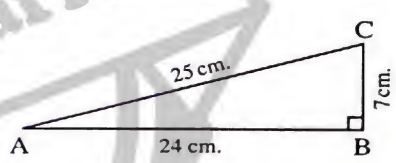
AB = 5 cm. and BC = 13 cm. , then tan B = ...

(a) $\frac{5}{13}$ (b) 2.4 (c) $\frac{13}{5}$ (d) $\frac{25}{12}$

(2) If Δ ABC is a right-angled triangle at B and cos A = 0.6 , then sin A = ...

(a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{5}{4}$ (d) $\frac{5}{3}$

(3) In the opposite figure :



sin A + sin C = ...

(a) 1 (b) 2

(c) $\frac{17}{25}$ (d) $\frac{31}{25}$

(4) If Δ ABC is a right-angled triangle at B , sin A = $\frac{16}{20}$ and BC = 4 cm. , then the area of Δ ABC = ... $cm.^2$

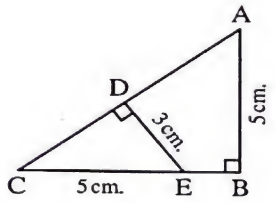
(a) 6 (b) 12 (c) 24 (d) 96

(5) For any two acute angles , if m ($\angle$ A) + m ($\angle$ B) = 90° , then .....

(a) sin A = cos B (b) sin A = sin B

(c) tan A = tan B (d) cos A = cos B

(6) In the opposite figure :



AC = ... cm.

(a) $\frac{3}{25}$ (b) $\frac{5}{3}$

(c) $\frac{25}{3}$ (d) $\frac{3}{5}$

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2 Δ ABC in which : AB = AC = 10 cm. , BC = 16 cm. Draw $\overrightarrow{AD} \perp \overline{BC}$ such that : $\overrightarrow{AD} \cap \overline{BC} = \{D\}$

Prove that :

(1) $\sin^2 C + \cos^2 C = 1$ (2) sin B + cos C > 1

---

3 ABCD is a trapezium in which : $\overline{AD} // \overline{BC}$, m ($\angle$ B) = 90° If : AB = 4 cm. , AD = 7 cm. , BC = 10 cm.

Prove that : cos ($\angle$ DCB) – tan ($\angle$ ACB) = $\frac{1}{5}$

Sheet 2

To	
Lesson	2
Unit	4

Answer the following questions :

1 Choose the correct answer from those given :

(1) If $\sin \mathcal{X} = \frac{\sqrt{3}}{2}$ where $\mathcal{X}$ is the measure of an acute angle , then $\mathcal{X}$ = ...

(a) 30° (b) 45° (c) 60° (d) 90°

(2) If Δ ABC is a right-angled triangle at B , $\sin C = \frac{3}{5}$ and AB = 6 cm. , then AC = ... cm.

(a) 5 (b) 10 (c) 6 (d) 3

(3) $\sin^2 30° + \cos^2 30°$ = ...

(a) $\frac{\sqrt{3}+1}{2}$ (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

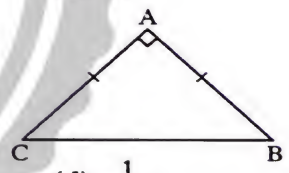
(4) If $\tan 3\mathcal{X} = \frac{1}{\sqrt{3}}$ where $3\mathcal{X}$ is the measure of an acute angle , then $\mathcal{X}$ = ...

(a) 10° (b) 20° (c) 30° (d) 40°

(5) **In the opposite figure :**

AB = AC , m (∠ A) = 90°

, then tan C = ...



(a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{3}}$

(6) If m (∠ A) = 75° , $\sin B = \cos A$, where ∠ B is an acute angle , then m (∠ B) = ...

(a) 45° (b) 75° (c) 15° (d) 105°

---

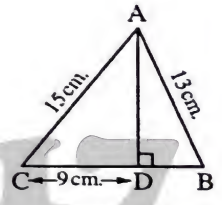
2 [a] Without using the calculator , find the value of $\mathcal{X}$ that satisfies :

$\sqrt{3} \tan \mathcal{X} = \sin 30° \cos 60° + \cos 30° \sin 60°$ (where $\mathcal{X}$ is the measure of an acute angle)

[b] In the opposite figure :

$\overline{AD} \perp \overline{BC}$, AB = 13 cm. ,

AC = 15 cm. , CD = 9 cm.



Find in the simplest form the value of the expression :

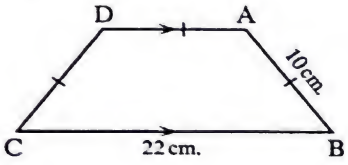
$$\frac{\tan (\angle CAD) + \tan (\angle BAD)}{\tan (\angle CAD) - \tan (\angle BAD)}$$

---

3 In the opposite figure :

ABCD is an isosceles trapezium in which :

AB = AD = DC = 10 cm. , BC = 22 cm.



Find : (1) m (∠ B) , m (∠ A)

(2) The area of the trapezium ABCD

Sheet 3

To	
Lesson	1
Unit	5

Answer the following questions :

1 Choose the correct answer from those given :

(1) The distance between the point (2 , 3) and the origin point equals .....

(a) $\sqrt{5}$ (b) $\sqrt{7}$ (c) $\sqrt{11}$ (d) $\sqrt{13}$

(2) The distance between the point (2 , – 4) and the x-axis = ... length unit.

(a) 2 (b) – 4 (c) $2\sqrt{5}$ (d) 4

(3) $\sin 60° + \cos 30°$ = ...

(a) zero (b) $\sqrt{3}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

(4) If $\sin C = 0.8$ where C is the measure of an acute angle , then $\cos C$ = ...

(a) 0.8 (b) $\frac{3}{5}$ (c) 1 (d) 0.2

(5) If $\cos 3x = \frac{1}{2}$ where $3x$ is the measure of an acute angle , then x = ...

(a) 10° (b) 20° (c) 60° (d) 90°

(6) If the distance between the two points (k , 0) , (0 , 3) is 5 length units , then k = ...

(a) 2 (b) 4 (c) – 4 (d) ± 4

---

2 **[a]** If the point A (8 , 9) lies on the circle whose centre is M (2 , 1) , find the area of this circle ($\pi = 3.14$)

[b] XYZ is a right-angled triangle at Y , in which XY = 5 cm. , XZ = 13 cm.

Find the value of : $\cos X \cos Z - \sin X \sin Z$

---

3 **[a]** If A (x , 2) , B (3 , 1) , C (5 , 0) and AB = BC , then find the value of x

[b] Prove that : the points A (0 , 2) , B (1 , 5) , C (2 , 8) are collinear.

Sheet 4

To	
Lesson	2
Unit	5

Answer the following questions :

1 Choose the correct answer from those given :

(1) If A (1 , 2) , B (3 , – 4) , then the coordinates of the midpoint of $\overline{AB}$ is .....

(a) (2 , 4) (b) (2 , – 1) (c) (2 , 1) (d) (– 2 , 1)

(2) If Δ ABC in which AB = BC = 5 cm. , AC = $5\sqrt{2}$ cm. , then tan (∠ C) = ...

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) 1 (d) $\frac{\sqrt{3}}{2}$

(3) If the distance between the two points A (3 , 1) , B (6 , $\mathcal{X}$) is 5 length units , $\mathcal{X} \in \mathbb{Z}_+$, then $\mathcal{X}$ = ...

(a) 1 (b) 3 (c) 5 (d) – 3

(4) If the origin point is the midpoint of $\overline{AB}$ where A (2 , – 3) , then B = ...

(a) (– 3 , 2) (b) (– 2 , 3) (c) (– 2 , – 3) (d) (2 , 3)

(5) If sin ($\mathcal{X}$ – 5) = $\frac{1}{2}$ where $\mathcal{X}$ is the measure of an acute angle , then $\mathcal{X}$ = ...

(a) 30° (b) 25° (c) 35° (d) 40°

(6) If M (5 , – 1) is the midpoint of $\overline{AB}$ where A (4 , y) , B (6 , 7) , then y = ...

(a) 9 (b) 5 (c) – 5 (d) – 9

---

2 **[a]** If tan 2 $\mathcal{X}$ = $\frac{2 \tan 30°}{1 - \tan^2 30°}$ where 2 $\mathcal{X}$ is the measure of an acute angle , then find $\mathcal{X}$

[b] If $\overline{AB}$ is a ladder of length 4 m. , leans with its upper end A upon a vertical wall and with lower end B on a horizontal land. If the measure of the angle of inclination of the ladder on the land = 60° , find the length of $\overline{AC}$ such that AC is the distance between its upper end A and the surface of the land.

---

3 If A (– 1 , 3) , B (4 , 3) , C (7 , 7) ,

Prove that : Δ ABC is an isosceles triangle and calculate its area.

Sheet 5

To	
Lesson	3
Unit	5

Answer the following questions :

1 Choose the correct answer from those given :

(1) The straight line which passes through the two points (0 , 0) and (2 , 5) is parallel to the straight line whose slope equals .....

(a) $\frac{5}{2}$ (b) $\frac{2}{5}$ (c) $\frac{-5}{2}$ (d) $\frac{-2}{5}$

(2) If the straight line L is perpendicular to the straight line passing through the two points (3 , –1) and (0 , – 2) , then the slope of L = ...

(a) $\frac{1}{3}$ (b) $\frac{-1}{3}$ (c) 3 (d) – 3

(3) If the points A (0 , 0) , B (5 , 7) and C (5 , k) are the vertices of the right-angled triangle ABC at C , then k = ...

(a) zero (b) 5 (c) 7 (d) – 5

(4) In the right-angled triangle ABC at B
If sin C = $\frac{3}{5}$ and AB = 6 cm. , then AC = ... cm.

(a) 5 (b) 10 (c) 6 (d) 3

(5) If $\mathcal{X}$ and y are the two measures of two supplementary angles such that $\mathcal{X}$: y = 1 : 2 , then sin $\mathcal{X}$ = ...

(a) $\frac{1}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) 1 (d) $\frac{\sqrt{3}}{2}$

(6) The straight line which passes through the two points (1 , 1) and (2 , 2) makes with the positive direction of $\mathcal{X}$-axis an angle of measure .....

(a) 30° (b) 60° (c) 45° (d) 90°

---

2 **[a]** If cos 3 $\mathcal{X}$ = $\frac{\sin 60° \sin 30°}{\tan 45° \sin^2 45°}$, find the value of $\mathcal{X}$ in degrees where 3 $\mathcal{X}$ is the measure of an acute angle.

[b] If A (2 , 2) , B (1 , – 1) , C (– 2 , – 2) and D (– 1 , 1) are four points in a perpendicular coordinates plane , **prove that :** the figure ABCD is a rhombus and find its area.

---

3 **Prove that :** The straight line which passes through the two points (3 , – 2) and (6 , 1) is parallel to the straight line which makes an angle of measure 45° with the positive direction of $\mathcal{X}$-axis.

Sheet 6

To	
Lesson	4
Unit	5

Answer the following questions :

1 Choose the correct answer from those given :

(1) The straight line whose equation is : $2x - 3y = 12$ intercepts from the negative part of y-axis a part of length ..... length unit.

(a) 4 (b) -4 (c) 12 (d) $\frac{2}{3}$

(2) $\overleftrightarrow{AB}$ is a straight line passing through the two points (2 , 5) and (5 , 2)
Which of the following points belongs to $\overleftrightarrow{AB}$?

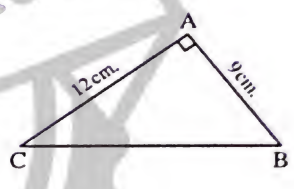
(a) (1 , 6) (b) (2 , 3) (c) (0 , 0) (d) (3 , -4)

(3) **In the opposite figure :**

$\sin B + \cos C =$ .....

(a) 1 (b) $\frac{8}{5}$

(c) $\frac{6}{5}$ (d) zero



(4) The two straight lines whose slopes are $\frac{4}{5}$ and $\frac{-5}{4}$ are .....

(a) parallel. (b) perpendicular.

(c) coincident. (d) not perpendicular.

(5) If $\sin x = \cos 30°$ and x is the measure of an acute angle , then $x =$ .....

(a) 90° (b) 60° (c) 45° (d) 30°

(6) The equation of the straight line whose slope equals $\frac{1}{2}$ and intercepts 3 length unit from the negative part of y-axis is .....

(a) $2y = x - 3$ (b) $2y - x - 6 = 0$

(c) $2y - x + 6 = 0$ (d) $2y + x - 6 = 0$

---

2 If the points A (1 , 0) , B (-1 , 4) , C (7 , 8) and D (9 , 4)

(1) **Prove that :** $\overline{BA} \parallel \overline{CD}$ and equal in length.

(2) **Prove that :** $m(\angle ABC) = 90°$

(3) **Find :** the equation of the straight line which passes through the two points A and C

---

3 [a] Without using calculator , find the value of : $\frac{\tan 30° (1 - \tan^2 30°)}{\sin 30° \cos 30°}$

[b] Prove that : The triangle whose vertices are A (3 , 2) , B (-4 , 1) and C (2 , -1) is right-angled , then find $m(\angle B)$